

REMARKS

Obviousness Rejection over Masuda and Yamamoto

On page 2 of the Office Action, in paragraph 1, claims 1, 3, 4, 8, 9, 11, 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2002-037643 (Masuda et al.) and JP 2002-003239 (Yamamoto et al.).

In response, Applicant submits initially that the present invention is directed to:

A vitreous antimicrobial agent comprising,
relative to 100 mass % of total glass components,
0.1 to 2 mass % of Ag₂O,
40.5 to 49 mass % of ZnO,
6 to 9.5 mass % of SiO₂,
30.5 to 39.5 mass % of B₂O₃,
2 to 10 mass % of an alkaline earth metal oxide, and
6 to 7.5 mass % of Na₂O.

Applicant wishes to emphasize that by using the antimicrobial agent comprising specific components with a specific component ratio, excellent antimicrobial properties can be achieved.

Moreover, Applicant notes that the object of the present invention is not only to obtain an antimicrobial agent having high antimicrobial properties, having excellent discoloration resistance and hot water resistance, but also to obtain an antimicrobial agent that can easily be produced on a commercial scale.

Turning now to the cited art, Applicant notes that Masuda is directed to:

An antimicrobial agent having,
in weight %

40 to 70 % of ZnO,
0.01 to 30 % of Ag₂O,
20 to 55 % of B₂O₃ + SiO₂ + P₂O₅
0 to 5 % of R₂O (R: Na, Li, K)
0 to 30 % of R' O (R': Mg, Ca, Sr, Ba) and
0 to 20 % of Al₂O₃.

Also, Applicant notes that Yamamoto is directed to:

An antimicrobial agent containing,
relative to the total amount of components,
54 to 60 mol% of ZnO,
25 to 32 mol% of B₂O₃,
7 to 12 mol% of SiO₂,
5 to 8 mol% of alkali metal oxide.

Applicant submits that Masuda discloses in [0014] that R₂O (R: Na, Li, K) may be added up to 5 weight % in order to improve fusion properties of glass and preferably is used at 2 weight % or less to avoid discoloration. **Therefore, there is no motivation for one of ordinary skill in the art to add more than 5 weight % of R₂O, especially 6 to 7.5 wt%.** The disclosure of Masuda teaches away of using R₂O at a range of more than 5 wt %.

Further, while the Examiner indicated that Yamamoto disclosed an antibacterial glass composition compound comprising 5 to 8 mol% of alkali metal oxide, Applicant submits that Yamamoto does not teach or suggest the glass composition compound comprising 6 to 7.5 weight % of Na₂O.

In this regard, Applicant translated the Examples of Yamamoto from mol% to weight % as follows.

| Yamamoto et al | | ZnO | SiO ₂ | B ₂ O ₃ | Na ₂ O | Al ₂ O ₃ |
|------------------------------|--------------|-------|------------------|-------------------------------|-------------------|--------------------------------|
| | mol% | 54-60 | 7-12 | 25-32 | 5-8 | (0-5) |
| TOAGOSEI JP2002- 3239A | Ex. 1-A | 56 | 11 | 27 | 6 | 0 |
| | Ex. 1-B | 55 | 7 | 29 | 5 | 4 |
| | Ex. 2-C | 66 | 9 | 28 | 7 | 0 |
| | Com. Ex. 1-D | 54 | 5 | 26 | 15 | 0 |
| | Com. Ex. 1-E | 40 | 15 | 36 | 9 | 0 |
| | Com. Ex. 1-F | 55 | 25 | 14 | 6 | 0 |

| Yamamoto et al | | ZnO | SiO ₂ | B ₂ O ₃ | Na ₂ O | Al ₂ O ₃ |
|------------------------------|--------------|------|------------------|-------------------------------|-------------------|--------------------------------|
| | wt% | | | | | |
| TOAGOSEI JP2002- 3239A | Ex. 1-A | 68.3 | 6.6 | 21.4 | 3.7 | 0.0 |
| | Ex. 1-B | 66.9 | 4.2 | 22.9 | 3.0 | 2.9 |
| | Ex. 2-C | 68.2 | 5.4 | 22.2 | 4.3 | 0.0 |
| | Com. Ex. 1-D | 66.8 | 3.0 | 20.9 | 9.3 | 0.0 |
| | Com. Ex. 1-E | 53.1 | 9.8 | 31.1 | 6.0 | 0.0 |
| | Com. Ex. 1-F | 69.3 | 15.5 | 11.5 | 3.8 | 0.0 |

All of Examples A, B, and C do not satisfy the Na₂O content of the present invention (6 to 7.5wt%). Only comparative example 1-D satisfies the Na₂O content of the present invention. However, one of ordinary skill in the art would not employ the Na₂O content of the comparative example of the prior art..

By selecting the elements of the glass composition such as Al₂O₃, ZnO, SiO₂, B₂O₃, alkaline earth metal oxide and Na₂O, and by controlling the content precisely, the vitreous antimicrobial agent of the present invention can be obtained. After a great deal of trial and error, Applicant could find the appropriate vitreous antimicrobial agent. Applicant submits that there is no reasonable expectation of success of achieving the present invention from the cited art.

Moreover, Applicant submits that the present invention provides unexpected results, as can be seen from the executed Rule 132 Declaration submitted herewith (an unexecuted version

is also submitted herewith which is clearer than the executed version, in the event that the executed version is difficult to read).

As can be seen from the discussion on page 4 in the Declaration and the results presented in Table 2 on page 5 in the Declaration, when Examples 1, 6, and 7 of Masuda et al. were commercially produced on a large scale such as a 100 kg scale, colorless glasses were not obtained. Furthermore, molding plates using the antimicrobial glasses after the hot water resistant test were decolored, and the antimicrobial effects after the hot water resistance test were greatly deteriorated. On the other hand, in the present invention, transparent (colorless) molding plates could easily be obtained. The molding plates (Nos. 1 and 2) to which antimicrobial agents formed from the glasses of Examples 1 and 2 of the present invention were added had excellent antimicrobial properties and excellent coloration resistance.

Thus, the Declarant concludes on page 6 of the Declaration that the present invention provides unexpectedly superior results. Accordingly, the present invention is not obvious for this additional reason.

In view of the above, Applicant submits that the present invention is not obvious over Masuda and Yamamoto, and withdrawal of this rejection is respectfully requested.

Obviousness Rejection over Masuda and Yamamoto in view of Emura

On page 5 of the Office Action, in paragraph 2, claims 2, 7, 10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable Masuda et al. and Yamamoto et al., as applied to claims 1, 3, 4, 8, 9, 11, 12 and 14 above, in view of JP 07-291654 (Emura et al.).

In response, Applicant submits that Emura does not make up for the deficiencies discussed above in regard to Masuda and Yamamoto. Accordingly, Applicant submits that even

when Emura is considered, the cited art does not teach or suggest the present invention. Further, Applicant submits that the present invention provides unexpectedly superior results, as set forth in the Rule 132 Declaration submitted herewith and as discussed above.

Accordingly, Applicant submits that the present invention is not obvious over Masuda and Yamamoto in view of Emura, and withdrawal of this rejection is respectfully requested.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


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